

---

# CHAPTER 12

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

### TABLE OF CONTENTS

12.00	INTRODUCTION
12.01	PURPOSE
12.02	POLICY STATEMENT
12.03	PERSONAL CLOTHING GUIDELINES
12.04	PERSONAL PROTECTIVE EQUIPMENT STANDARDS
12.05	HEAD PROTECTION - HARD HATS
12.06	EYE AND FACE PROTECTION
12.07	EMERGENCY EYEWASH AND SHOWER REQUIREMENTS
12.08	EAR AND HEARING PROTECTION
12.09	HAND AND ARM PROTECTION
12.10	BODY AND LEG PROTECTION
12.11	WARNING GARMENTS: VEST, JACKETS, SHIRTS, AND COVERALLS
12.12	RAINGEAR
12.13	FOOT PROTECTION
12.14	JEWELRY
12.15	ELECTRICAL PROTECTION
12.16	FALL PROTECTION
12.17	WORKING OVER OR NEAR WATER

# CHAPTER 12

## **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

### **12.00 INTRODUCTION**

Personal protective equipment (PPE) is subject to health and safety regulations contained in the California Occupational Safety and Health Administration (Cal-OSHA) General Industry Safety Orders (GISO), Construction Safety Orders (CSO), and/or the Electrical Safety Orders (ESO).

This chapter provides information about specific items and/or categories of PPE used to protect and shield employees from injury or illness.

### **12.01 PURPOSE**

The purpose of Chapter 12 is to provide information about PPE and how it can protect each major body area.

### **12.02 POLICY STATEMENT**

Managers and supervisors are responsible to ensure that appropriate PPE is readily available as needed and used correctly to protect employees from exposure to physical or environmental hazards that may cause injury or illness. Unless stated otherwise, the Department provides the required PPE.

### **12.03 PERSONAL CLOTHING GUIDELINES**

Employees are expected to report to work reasonably dressed to protect themselves during routine assignments and from exposure to usual and/or predictable physical and environmental conditions found in the workplace.

Employees shall be given adequate advance notice of field trips so they may properly dress to protect themselves from exposure to the conditions in the new assignment.

---

**12.04 PERSONAL PROTECTIVE EQUIPMENT (PPE) STANDARDS**

Title 8 of the California Code of Regulations (CCRs), also known as the Cal-OSHA Regulations, requires employers to provide PPE. Section 3380, GISO Personal Protective Devices and CSO Section 1514 requires that:

- All safety devices and safeguards required to be used by employees are the proper type for expected exposure and of such design, strength, and quality as to eliminate, preclude or mitigate the hazard;
- PPE shall be distinctly marked to facilitate identification of the manufacturer;
- The supervisor shall assure that each employee is trained and uses PPE in accordance with the manufacturer's instructions;
- Employee-owned/visitor-owned PPE complies with standards and regulations prescribed by Cal-OSHA and Caltrans. Supervisors shall assure that the equipment is maintained in a safe condition;
- All PPE shall be fit and designed appropriately so as to provide adequate protection against the hazards for which it is designed; and
- Safety devices and safeguards shall be reasonably comfortable and not unduly encumber an employee's movements necessary to perform his/her work.

Supervisors are responsible to ensure that employees are given appropriate PPE wherever they may be exposed to hazardous conditions that can cause injury or illness.

All Caltrans PPE that requires special identification shall be clearly marked with the appropriate American National Standard Institute (ANSI) logo, specification numbers, and/or manufacturer's mark, label, tag, initial, monogram, serial number, or other applicable identification.

When employees are involved in a work activity where they may be exposed to a hazard that can cause injury or illness, they are responsible to use good judgment and wear PPE as directed.

When employees receive equipment, supervisors will provide training as to why and how the equipment must be used. Additionally, supervisors should allow employees time to try out new PPE and/or new devices prior to actual field use. Employees should offer their comments and discuss questions before work begins.

---

## 12.05 HEAD PROTECTION - HARD HATS

GISO Section 3381, Head Protection, requires that:

- Employees exposed to falling or flying objects, or hazardous chemical substances, and/or electrical shock and burns shall wear a hard hat for head protection; and
- Hard hats shall meet the applicable requirements and specifications established by ANSI, as follows:
  - ❖ *GISO 3381(b)(1)*, For exposure to flying or falling objects, or electric shock/burns (600 volts or less) hard hats placed in service after October 30, 2004 shall comply with ANSI Z89.1 1997, Class E or Class G. **This applies to all work activities, EXCEPT electrical and tree maintenance work activities.**
  - ❖ *GISO 3381(c)*, For exposure to flying or falling objects, and high voltage electric shock (above 600 volts) shall comply with ANSI Z89.1 1997, Class G. **This applies to ALL work activities, INCLUDING electrical and tree maintenance work activities.**

### WHEN TO WEAR A HARD HAT

Employees are responsible to wear hard hats during any work activity that may expose them to a head injury. Some of the most common work activities requiring hard hats are:

- Exposure to falling or flying objects, or hazardous chemical substances, and/or electrical shock and burns;
- Working on-foot within the right-of-way of any highway or road, which includes freeways, multi-lane highways, and city streets;
- Working on-foot during any work activity where motorized equipment or motor vehicles are being used; and
- Operating any motorized equipment not equipped with an “enclosed cab.”

An “enclosed cab” is defined as motorized equipment with a windshield, doors, and surrounding cab protection with metal components and window glass. Motorized equipment with a covered operator area, or roll-over protection only, is not considered an “enclosed cab.”

Hard hats may be removed by the operator while driving a motor vehicle or motorized equipment that has an “enclosed cab,” but the operator shall put on his/her hard hat when exiting the vehicle or equipment and before beginning any on-foot work activity where hard hats are required.

---

## 12.05 HEAD PROTECTION - HARD HATS (con't)

### PROPER FIT AND PROTECTION

Hard hat suspension shall be correctly adjusted to ensure a proper and secure fit. Chin straps shall be required as work conditions warrant. All hard hats shall be worn per the manufacturer's instructions. No head wear (ball caps, etc.) shall be worn under the hard hat unless specifically designed to be worn under the hard hat.

Supervisors are responsible to ensure the hard hat style is properly suited for the assigned work. For example, if the hard hat restricts an employee's ability to safely perform his/her duties, or exposes an employee to an unsafe working conditions, the supervisor shall direct the employee to wear hard hat protection that is suitable to the assigned work.

### DESIGN FEATURES

The Department authorizes the use of two (2) hard hat designs; the traditional and the western cowboy style. The Department provides **only** the traditional style hard hats (cap style with front brim or hat style with wide brim all around). Employees are authorized to wear the western cowboy style hard hats but must purchase their own; however, employees engaged in electrical and tree maintenance work activities are prohibited from wearing the western cowboy style-hard hat. The use of metal hard hats is prohibited.

The following colors have been adopted for official use to distinguish different work activities within Caltrans:

- **White**-colored hard hat with the traditional Caltrans "CT" logo is the designated hard hat for most Caltrans employees and is used in most work settings;
- **Yellow**-colored hard hat is the accepted standard color for electrical work crews;
- **White**-colored hard hat *without* the traditional Caltrans "CT" logo is used by "Adopt-A-Highway-Program" participants. The Adopt-A-Highway logo may be embossed on the hard hats; and,
- **Orange**-colored hard hats have been adopted for use by the "Special Program People" performing litter pick up.

Caltrans employees should have the traditional "CT" logo decal on their hard hats.

Employees may also have a First Aid certification decal and an Accident Free (xx) Years decal affixed to their hard hats. The employee's name and reflective tape may be applied to hard hats.

Employees shall not place or affix any other decals, tags, stickers, monograms, badges, or similar items on their hard hats without supervisory approval.

---

## 12.06 EYE AND FACE PROTECTION

If an employee wears prescription eye glasses, suitable safety glasses or goggles shall be provided.

GISO Section 3382, Eye and Face Protection, requires that:

- Employees who work where there is a risk of receiving eye and face injuries such as punctures, abrasions, burns or contusions as a result of contact with flying particles, hazardous substances, projections, pesticides, or light rays in connection with welding operations shall be protected with appropriate eye and face protection.

**Note:** Appropriate eye and face protection means using safety glasses, goggles, or face shields suitable for the expected hazard.

Suitable screens or shields isolating the hazardous exposure from welding operations to nearby employees shall be used.

Eye and face protection shall be identifiable as being ANSI Z87.1-1989 compliant.

Employees are responsible to wear eye protection during any work activity that may expose them to eye injury. The following examples illustrate some of the most common work activities where eye protection is required:

- Eye protection shall be worn whenever an employee is working on-foot within the right-of-way of any highway or road, which includes freeways, multi-lane highways, and city streets.
- Eye protection shall be worn by employees on-foot during any work activity where motorized equipment or motor vehicles are being used.
- Eye protection shall be worn by the operator (e.g., while driving) of any motorized equipment that is not equipped with an enclosure or cab.
- Eye protection may be removed by the operator while driving a motor vehicle or motorized equipment which has an enclosure or cab, but shall be put on when exiting the vehicle or equipment and before beginning any "on-foot" work activity.

---

**12.06 EYE AND FACE PROTECTION (con't)****STATE-FURNISHED PRESCRIPTION SAFETY GLASSES**

Qualifying employees who wear prescription eye glasses shall be provided with two (2) pair of State-furnished safety glasses annually, if their prescription changes. Employee vision insurance plans usually provide for an annual eye examination.

**Who qualifies for State-furnished prescription safety glasses?**

Employees who work in field locations or who take regular field trips where there is risk to eye injury qualify for State-furnished safety glasses.

**Who pays for the eye examination?**

The cost of the eye examination is paid for by the employee, through the employee's vision insurance plan. The time required for the eye examination is charged to the employee's leave balances.

**Ordering replacement broken, scratched, lost or damaged glasses**

Replacement lenses and/or frames will be paid for by the Department when there is a change in the prescription or the glasses are broken, scratched, or damaged during any work activity through no fault of the employee.

**Note:** Supervisors do not have to order two (2) pair of glasses every time an employee breaks only one (1) pair of glasses. Glasses may be ordered one pair at a time. Additional orders shall not be made to circumvent the two-pair-per-year limit.

**Prescription eye glasses for spraying pesticides**

Employees who wear prescription eye glasses and spray pesticides may be provided with one (1) additional pair of prescription safety glasses.

The glasses used for pesticide spraying are manufactured with specialized frames to provide front, brow, and temple protection in compliance with Title 3, Department of Food and Agriculture Pesticide Application Regulations.

Employees who wear prescription eye glasses and work as Hazmat spill response team members may be provided with one (1) pair of specialized lenses to be fitted inside their full face-piece respirator.

---

**12.06 EYE AND FACE PROTECTION (con't)****ORDERING PRESCRIPTION SAFETY GLASSES**

Qualifying employees will be furnished with at least two (2) pairs of glasses. If an employee's prescription changes, they may qualify for a third pair of safety glasses.

The first two (2) pairs of prescription safety glasses are for employees who work in field locations and can be ordered in any combination of clear, tinted, or photo-gray extra glass. One pair of the glasses must be clear or photo-gray extra.

The reason for issuing at least one (1) pair of safety glasses in either clear or photo-gray extra glass is to ensure that the employee will always have at least one pair of safety glasses available for either day or night work.

**For pesticide spraying**

To comply with the requirements of Title 3, Department of Food and Agriculture Pesticide Application Regulations, one (1) pair of safety glasses must be ordered with specialized frames that provide front, brow, and temple protection. This pair of safety glasses must be ordered in clear or photo-gray extra to assure that the employee will always have a pair of safety glasses available for day work or night work.

**For full facepiece respirator**

The specialized ground lenses for full facepiece respirators must be ordered in clear or photo-gray extra.

All prescription safety glasses must be ordered on the PRESCRIPTION SAFETY GLASSES/LOCAL REQUEST, ADM FORM 0205. The Purchasing Branch in Administration will process all orders through a Contract Delegation Purchase Order (CD/PO).

All State agencies are required to order glasses for their employees through California Prison Industry Authority (PIA). PIA normally use eyeglass frames that fit the average person; therefore, oversize or undersize frames and lenses sizes may require special ordering procedures. Employees or procurement personnel should contact their District or Headquarters Safety Office for assistance.

The doctor's prescription is included in the Form 0205 and is sent to PIA where the lenses are fitted to PIA furnished frames. [A sample of Form ADM 0205, PRESCRIPTION SAFETY GLASSES/LOCAL REQUEST, is included at the end of this chapter.](#)

Employees may select eyeglass frames from designated locations; i.e., Maintenance Regional Offices, District/Headquarters Warehouses, or other designated locations.



---

**12.06 EYE AND FACE PROTECTION (con't)****TEMPLE WIDTH OF GLASSES AND DRIVING RESTRICTIONS**

The California Vehicle Code, Section 23120, TEMPLE WIDTH OF GLASSES, states:

"No person shall operate a motor vehicle while wearing glasses having a temple width of one-half inch or more if any part of such temple extends below the horizontal center of the lens so as to interfere with lateral vision." Safety glasses with side temple protectors, including those required to comply with the Title 3 pesticide spray regulations, which may violate this motor vehicle code section, shall not be worn while driving.

**CONTACT LENS WEARERS**

Contact lenses do not provide eye protection. Employees who wear contact lenses should not enter a work environment where there is a risk of receiving eye injuries unless they wear eye protection.

Contact lenses are prohibited when:

- working with solvents, gases, mists, dust, and vapors;
- performing automotive/equipment repairs;
- working with storage batteries (replacement, charging, jumping, etc.);
- welding (gas/arc);
- working on machinery with moving parts; e.g., grinders, lathes;
- working in trees, bushes, or shrubs; and/or
- working with chemicals/pesticides.

Contact lenses may be worn, but eye protection (glasses or goggles) must also be worn over the contact lens:

- during any work in an environment that may cause injury to the eyes;
- while working along highways, freeways; and/or
- while working within a maintenance, construction, or similar work zone.

**WELDING OPERATIONS**

Proper helmets or goggles must be worn during welding, cutting, or brazing operations to prevent eye damage. It is critical that the correct tint or shade of protection is used. See GISO Section 3382, "Eye and Face Protection," for guidance.

The tinted glass in welding helmets and goggles is permanently marked to indicate the shade or tint and must be tempered and free from flaws. Do not use lenses that are not the correct shade or tint for the work. Generally, goggles or helmets for oxy-acetylene are not acceptable for electric arc welding/cutting. Makeshift devices such as painted lenses, combined lenses, sunglasses (unless specifically made for the work), etc., will not be used.

Inspect goggles and helmets before use, check lenses and body for cracks, pinholes, or other damage. Repair or replace before use. Helmets must protect the face, neck, and ears from direct radiant energy.

Suitable shields and screens or other methods shall be used to isolate nearby employees from welding/cutting operations.

**12.07 EMERGENCY EYEWASH AND SHOWER REQUIREMENTS**

GISO Section 5162, Emergency Eyewash and Shower Equipment, requires that a plumbed or self-contained eyewash, meeting sections 5, 7 or 9 of ANSI Z358.1 - 1981, be provided in all work areas where:

- During routine or foreseeable emergencies, the eyes of the employee may come into contact with a substance that is corrosive, a severe irritant, causes permanent tissue damage, or is toxic by absorption.
- If the substance can get on the skin or body, an emergency shower meeting ANSI Z358.1 – 1981 sections 4 or 9 is also required.

These ANSI requirements require a continuous water flow for at least 15 minutes. The eyewash or shower equipment shall be in accessible locations requiring no more than 10 seconds to reach. The area around the eyewash/shower shall be maintained free of all items that would obstruct their use. Plumbed eyewash and shower equipment shall be activated at least monthly to flush the lines and verify proper operation. This monthly inspection shall be documented.

ANSI approved personal eyewash bottles and drench hoses can supplement approved eyewash facilities, but cannot be used instead of the required eyewash. Water hoses, sink faucets, showers, etc. are not acceptable eyewash facilities.

**12.08 EAR AND HEARING PROTECTION**

GISO Sections 5095 through 5100, and CSO Section 1521 require the Department to administer a hearing protection program for its employees.

Hearing protection shall be worn whenever the noise level is 90 decibels or more. If an employee is exposed to noise hazards exceeding 85 decibels over an 8-hour time weighted average, he/she must be enrolled in the Department's Hearing Conservation Program. Chapter 13 contains in-depth information regarding this program.

**12.09 HAND AND ARM PROTECTION**

GISO Section 3384, Hand Protection, and CSO Section 1520 require that:

- Employees who may be exposed to hazards to the hand such as cuts, burns, harmful physical or chemical agents that are capable of causing injury or impairments shall be provided with hand protection; and
- Hand protection, such as gloves, shall not be worn where there is a danger of the hand protection becoming entangled in moving machinery or materials.

Glove selection shall be based upon what is best suited for the expected hazard. Selection criteria should include thickness or gauge of the material, which directly affects the employee's dexterity, tactility, and hand fatigue. Heavier gloves should be selected for durability and greater protection in jobs where heavy or sharp objects will be handled.

Gloves used for handling toxic chemicals must comply with the requirements described in the Material Safety Data Sheet (MSDS) and the label for the particular product being handled.

Employees exposed to caustic or toxic chemicals, flying objects, abrasives, or sparks should wear long-sleeved shirts that protect their arms from injury.

Sleeveless shirts and garments that expose bare shoulders or bare arms do not provide adequate protection against most physical and environmental hazards and are not acceptable.

Employees should not wear loose sleeves, tails, ties, lapels, cuffs, or other loose clothing around moving machinery or other locations that can expose them to injury.

Supervisors are expected to require employees to wear clothing that is appropriate for the job assignment and that protects the employee from work site hazards.

---

**12.10 BODY AND LEG PROTECTION (Back Belts and Chainsaw Leg Protection)**

GISO Section 3383, Body Protection, and CSO Section 1522 require that:

- Employees shall be provided with appropriate body protection whenever their work exposes parts of their bodies, not otherwise protected, to hazardous or flying substances or objects;
- Employees shall wear clothing appropriate for the work being done. Loose sleeves, tails, ties, lapels, cuffs, or other loose clothing that can be entangled in moving machinery shall not be worn; and
- Clothing saturated or impregnated with flammable liquids, corrosive substances, irritants or oxidizing agents shall be removed and shall not be worn until properly cleaned.

In addition to the Cal-OSHA requirements listed above, the following body and leg protection guidelines shall be followed:

**Personal Clothing Must Protect the Body and Legs**

- Employees are responsible to report to work adequately dressed to protect themselves from routine physical and environmental hazards found in the workplace.
- Personal clothing should provide protection from such things as sunburn, poison oak, insect bites, vegetation, and/or chemicals.
- Garments that expose upper body parts (midriff) and bare legs; (e.g., shorts and cutoff pants) do not provide adequate protection against most physical and environmental hazards. Supervisors are expected to require employees to wear clothing that is appropriate for the job assignment and that protects employees from work site hazards.
- Employees exposed to caustic or toxic chemicals, hot materials, splashing or flying materials, abrasives, corrosives, and/or sparks shall not be allowed to wear short pants or other personal apparel that increases their exposure to injury.

**Back Belts (lumbar support)**

It is departmental policy that back belts may be purchased only for employees who have a doctor's prescription specifically indicating that the employee should use a back belt for specific work activities. Medical prescriptions will usually refer to back belts and similar devices as "lumbar support."

The National Institute for Occupational Health and Safety (NIOSH) does not recommend the use of back belts to prevent injuries among uninjured workers, and does not consider back belts to be PPE.

The most effective means of minimizing the possibility of back injury is through training on proper lifting techniques.

See Chapter 7 - ERGONOMICS for more details.

---

**12.10 BODY AND LEG PROTECTION (Back Belts and Chainsaw Leg Protection) (con't)**

**Leg Protection (Chain Saw CHAPS)**

Chain saw leg protection shall be worn by all chain saw operators while working on the ground. Use of chain saw leg protection for employees working above ground level is optional. Supervisors shall determine when this option will be applied.

All chain saw operators shall successfully complete the *Chain Saw Training* program and be properly certified.

---

### 12.11 WARNING GARMENTS: VEST, JACKETS, SHIRTS, AND COVERALLS

CSO Section 1598(c) and (d) TRAFFIC CONTROL FOR PUBLIC STREETS AND HIGHWAYS, and Section 1599(d) and (e) FLAGGERS require that:

Employees and flaggers shall be clearly visible to approaching traffic at all times. While working on foot and exposed to the hazards of vehicular or equipment traffic, they shall wear orange, strong yellow-green, or fluorescent versions of these colored warning garments such as, vests, jackets, shirts, or coveralls. During hours of darkness, warning garments shall also have silver, orange, or strong yellow-green colored reflective material that is visible at a minimum of 1,000 feet.

To ensure maximum employee visibility to approaching traffic, warning garments conforming to the ANSI/ISEA 107-2004 standard shall be worn. The following rules apply **during daylight hours**:

- An ANSI/ISEA 107-2004 Class II compliant warning garment is the standard for all Caltrans operations. The current issue Caltrans vest is ANSI/ISEA 107-2004 Class II compliant.
- ANSI/ISEA 107-2004 Class II or Class III compliant warning garments shall be worn whenever working on-foot, within the right-of-way or near vehicular or equipment traffic.
- Flaggers shall wear ANSI/ISEA 107-2004 compliant Class III warning garments.
- Raingear must be ANSI/ISEA 107-2004 Class III compliant OR ANSI/ISEA 107-2004 Class III compliant warning garments must be worn *over* the raingear.

To ensure additional visibility at night, warning garments that are ANSI/ISEA 107-2004 Class III compliant must be worn.

Warning garments that are faded, damaged, or have low visibility shall be discarded. Warning garments that are contaminated by a hazardous material shall not be laundered at home. If warning garments with reflective material are laundered at home, use mild detergent and low heat settings to avoid damage to the reflective material.

Employee- or visitor-owned warning garments must comply with this section, or shall not be worn. Supervisors shall ensure that warning garments are ANSI/ISEA compliant and maintained in a safe and sanitary condition. (See Section 12.04 of this chapter for additional information about PPE standards.)

**12.11 WARNING GARMENTS: VEST, JACKETS, SHIRTS, AND COVERALLS (con't)**

Warning garments shall be clearly identified with the appropriate ANSI logo. The warning garment must also be clearly marked to identify compliance with the specific ANSI/ISEA 107 Class and standard. Additional tags detailing care and instructions for use must also be affixed to an ANSI/ISEA 107 compliant warning garment.

ANSI/ISEA 107 designates three classes (Class I through Class III) of warning garments with Class III providing the highest level of visibility. Class II warning garments are usually vests while Class III compliant warning garments are usually shirts or jackets. ANSI/ISEA 107 Class "E" warning garments are also available. High visibility pants are a typical example of an ANSI/ISEA 107 Class E warning garment. Class E warning garments are considered an accessory garment and are not designed to be worn alone but when worn with a Class II warning garment will increase the classification of the ensemble to Class III. Class E warning garments may also be worn with a Class III warning garment.

**12.12 RAINGEAR**

Employees shall be provided with raingear to protect them from exposure to rain, snow, or other wet conditions.

See Section 12.11 WARNING GARMENTS: VEST, JACKETS, SHIRTS, and COVERALLS for additional information.

### **12.13 FOOT PROTECTION**

GISO Section 3385, Foot Protection requires that:

- Employee footwear must be appropriate for the hazard to which he/she will be exposed and provide protection from hot, corrosive, and/or poisonous substances, falling objects, and/or crushing or penetrating actions that may cause injuries to the foot;
- The footwear shall also provide protection from slips, falls, and moisture for employees who are required to work in abnormally wet and/or icy locations;
- Footwear that is defective or inappropriate to the extent that its ordinary use creates the possibility of foot injury shall not be worn; and
- Safety-toe footwear purchased on or before January 26, 2007 shall meet the requirements of either the American National Standard for Men's Safety-Toe Footwear, Z41.1-1999, or the American Society for Testing and Materials (ASTM) F2412-05, Standard Test Methods for Foot Protection and ASTM F 2413-05, Standard Specification for Performance Requirements for Foot Protection.

It is Caltrans policy that employees are responsible to provide their own footwear.

Caltrans will furnish footwear for special work activities including metal toe covers, high top rubber boots, hip waders, or rubber overshoes for use during inclement weather.

Supervisors are responsible to ensure that employees wear appropriate footwear for the task and/or work area in which they are assigned.

### **OFFICE WORK**

As a general rule, most shoes are acceptable footwear for office work activities. However, when leaving the office to make a field trip to a construction or maintenance work zone, or working/walking on a freeway or highway, additional foot protection may be necessary. Leaving the office to visit another building or driving a vehicle to another city would not generally require additional foot protection.

### **FIELD WORK**

As a minimum, appropriate footwear for employees working in field work assignments; highway maintenance, highway landscape, construction, surveys, equipment shops, and/or building maintenance environments such as painters, plumbers, electricians, or similar work activities is defined as:

"A serviceable leather work shoe or boot with soles made of neolite, neoprene, crepe rubber, or similar material that will not disintegrate or be affected by petroleum solutions and will retain a non-slip surface under wet, damp, oily, or muddy conditions."



---

**12.13 FOOT PROTECTION (con't)****UNACCEPTABLE FOOTWEAR**

The following are examples of unacceptable footwear for employees who work in field assignments and office employees who are on field trips:

- sandals and slippers;
- open toe shoes and/or high heels;
- footwear with leather soles; or
- any type of “loose open weave upper”

“Loose open weave upper” is defined as footwear that has been fabricated with loose open weave that would allow liquids or sharp objects to easily penetrate the fabric.

The reference to loose open weave is not intended to prohibit the use of footwear that has been fabricated with portions of Gortex, nylon, or other similar tightly woven fabrics that prohibit or impede penetration of the fabric.

Generally, shoes that are not specifically fabricated for use in work environments found in highway maintenance and or highway construction activities would fall into the category of prohibited footwear for the purposes of this interpretation.

For example, athletic or running shoes are not acceptable foot protection for fieldwork in maintenance, construction, surveys, or similar work activities.

**FOOT PROTECTION FROM CHEMICAL HAZARDS**

When using hazardous materials such as chemical herbicides, methacrylate, or other similar materials, the supervisors shall read the product labels and the Material Safety Data Sheet (MSDS) to determine the type and level of foot protection required. Supervisors should ensure that employee footwear provides adequate foot protection from any hazardous materials being used.

**FOOT PROTECTION FROM CRUSHING HAZARDS**

When working with heavy beams, materials drill rods, jackhammers, etc., where an employee's foot can be crushed or cut, appropriate foot protection shall be required that meets ANSI Z41 - 1999. Toe caps or metatarsal guards are available. For specialized situations, contact the Headquarters or District Health and Safety Office for assistance.

**12.14 JEWELRY**

Cal-OSHA GISO Section 3384, Hand Protection, Note 2 states: *Wrist watches, rings, or other jewelry should not be worn while working with or around machinery with moving parts in which such objects may be caught, or around electrically energized equipment.*

**12.15 ELECTRICAL PROTECTION**

The Electrical Safety Orders (ESO) are contained in Subchapter 5 of the Cal-OSHA regulations. The following is a brief overview of some of the common ESO regulations that shall be followed in Caltrans operations. This information is general in nature and should not be used as a substitute for the entire electrical standards contained in the ESO.

ESO provides minimum standards to safeguard life or limb, health, and/or property of employee and public welfare by regulating and controlling the design, construction and quality of materials, as well as the use of electrical devices and apparatus.

ESO Sections 2320.1 through 2320.9 require that:

- Only qualified persons shall work on electrical equipment or systems;
- Only qualified persons shall be permitted to perform any function in proximity to energized parts;
- Employees who are exposed to electrical hazards as a result of installing, operating, maintaining, or inspecting electrical apparatus shall be provided with appropriate electrical protective devices, which include hard hats, safety glasses, gloves, aprons, or arm protectors;
- Work shall not be performed on exposed energized parts of equipment or systems unless supervisors have reviewed the work; employees are qualified electrical workers; employees are instructed on the work techniques and hazards involved; suitable PPE is used; suitable eye protection is used; suitable barriers, tags, or signs are in place; and a final inspection is made;
- Hard hat protection must comply with Section 12.05, Head Protection;
- Electrical battery storage and battery handling areas must be equipped with emergency drench showers and eye wash stations. Employees must wear eye protection with side as well as frontal protection and acid-resistant gloves and aprons; and
- Electrical protective devices shall conform to applicable ANSI standards. For specific information covering electrical work, contact an electrical supervisor or superintendent located in each Caltrans district.

## 12.16 FALL PROTECTION

Fall protection must be used whenever an employee is exposed to falling more than seven and a half (7½) feet to the ground or level below. Fall protection is usually provided by standard guardrails or barriers, which protect the edge. Otherwise, either a personal fall restraint or personal fall arrest system is required. **All employees using aerial lift equipment must use a personal fall protection system.**

### STANDARD GUARDRAILS

Standard guardrails are the preferred method of fall protection to prevent employees from falling. Standard guardrails consist of a top rail and a mid rail that must be between 42 to 45 inches high and must protect openings on all open sides. Refer to Title 8 CCR § 3209 for specific guardrail construction requirements.

### PERSONAL FALL RESTRAINT SYSTEM

The purpose of a personal fall restraint system is to prevent an employee from falling. This system restrains an employee from approaching the edge. A personal fall restraint system consists of:

- A body belt or body harness with side D-rings;
- An anchorage point capable of supporting four times the intended load; and
- A two-foot lanyard (for situations where a two-foot lanyard is too short for an employee to reach his/her work, a longer lanyard may be used but must be rigged to prevent the employee from falling).

If the fall restraint cannot be rigged in such a way as to prevent a fall, a personal fall arrest system is required.

### PERSONAL FALL ARREST SYSTEM

The purpose of a personal fall arrest system is to arrest an employee's fall from a work level. This system allows the employee to work in situations where a fall is possible, but must limit free fall to a maximum of six (6) feet.

A personal fall arrest system consists of:

- a body harness with D-ring at the center of the back;
- a decelerating/shock-absorbing lanyard rigged to limit a maximum free fall to six (6) feet; Or
- a self retracting lifeline
- an anchorage point designed to hold a minimum of 5000 pounds, 3000 pounds for a self retracting lifeline or, installed as part of a complete personal fall protection system designed under the supervision of a professional engineer with a safety factor of at least two; and

**12.16 FALL PROTECTION (con't)**

A personal fall arrest system consists of (con't):

- adequate clearance to ensure an employee cannot contact the ground, any obstructions below, passing traffic, etc. in case of a fall.

Fall arrest systems **cannot** be utilized when working in aerial equipment unless that equipment is designed to support at least 5000 pounds or installed as part of a complete personal fall protection system designed under the supervision of a professional engineer with a safety factor of at least two. Because most aerial equipment cannot support this load, personal fall restraint is the preferred fall protection system in aerial lift equipment.

Specific locations requiring use of fall protection equipment include employees:

- Exposed to falling over seven and a half (7½) feet from walkways, catwalks, scaffolds, work surfaces, bridge decks, perimeters of buildings, shaftways, openings, or sloped roofs;
- Working on suspended scaffolds, boatswain's chairs, float scaffolds, and suspended staging;
- Working in trees; and
- Working in vehicle-mounted elevating work platforms and aerial lift equipment (bucket trucks, pin-on-platforms, etc.).

All fall protection equipment must be properly labeled to show that it complies with ANSI Standard A10.14–1991, or Z359.1-1992.

**EXCEPTIONS:**

- Tree workers' saddles must be "approved." but do not fall under the ANSI A10.14 - 1991 standard.

Bridge inspection and cut slope operations where specially trained employees use mountain climbing equipment. Such equipment must be labeled as meeting Union International Alpine Association (UIAA) requirements. These employees must also follow and comply with a special Code of Safe Practices prepared specifically for their operations

**Fall arrest system use requirements**

An Emergency Plan must be prepared to make provisions for prompt rescue in case of a fall. Additionally, there shall be at least one additional person on site trained in the use of fall arrest equipment, aerial lift and emergency lowering procedures. If an outside agency (e.g., fire department) will provide rescue, advance contact to confirm availability is required.

**12.16 FALL PROTECTION (con't)**

All fall protection equipment shall be positioned to allow adequate clearance. If working over a traffic lane, the lane must be closed if contact with traffic is possible.

Employees using fall protection equipment must be secured from falls at all times. Guardrails are not to be used as anchorage points unless specifically designed for that purpose (standard guardrails mounted on Caltrans sign structures are not designed for anchorage).

- Lanyards will not be knotted or tied on themselves to reduce length;
- Lanyards will not be clipped together;
- Snap hooks on lanyards shall be of the locking type;
- Snap hooks shall not be hooked to loops on web lanyards;
- No more than one snap hook shall be hooked to any one D-ring;
- All employees who use fall protection equipment will be trained in its use;
- All fall protection equipment will be inspected daily, before each use, and defective equipment will not be used;
- If lanyards are attached to vertical lifelines, a separate vertical lifeline shall be provided for each employee;
- If lanyards are attached to horizontal lifelines, up to two (2) employees may each use a horizontal lifeline;
- Lifelines shall be designed and installed as required by ANSI standards; and,
- Lanyards shall be secured to a substantial member of a structure, equipment, tree, or to securely rigged horizontal or vertical lifelines.

Inspection of fall protection equipment shall take place before and after every use and shall focus on:

- Cuts
- Cracks
- Tears or abrasions
- Undue stretching
- Faulty springs
- Defective or distorted snap hooks
- Operational defects
- Heat
- Acid or other corrosion
- Overall deterioration
- Mildew

Contact the District/Headquarters Health and Safety Office for assistance.

---

**12.17 WORKING OVER OR NEAR WATER**

CSO Section 1602, Work Over or Near Water and Cal-OSHA GISO Section 3389, Life Rings and Personal Flotation Devices, require that:

- Where there is a danger of drowning, employees must wear a U.S. Coast Guard approved personal flotation device (PFD);
- At least one (1) approved 30-inch life ring with not less than 150 feet of 600-pound capacity line attached shall be kept readily available;
- Life rings shall not be more than 200 feet apart;
- Any PFD shall be approved by the U.S. Coast Guard as a Type I PFD, Type II PFD, Type III PFD, or a U.S. Coast Guard approved Type V PFD that is marked or labeled for use as a work vest for commercial use or for use on vessels.
- PFDs shall be maintained in good condition; these items must be inspected before and after each use for defects that would alter their strength or buoyancy;
- PFDs shall be removed from service when damaged so as to affect their buoyant properties or capability of being fastened; and
- One or more lifesaving boats will be readily accessible at all times. Boats shall be properly maintained, ready for emergency use and equipped with oars and oarlocks, boat hook, anchor, ring buoy with 50 feet of 600 lb. line and two life preservers. Oars are not required with boats with outboard motors.

If lifeboats cannot be used because of swift currents, lines shall be stretched across watercourses with tags or floating planks at intervals less than six (6) feet. If impracticable, other arrangements to provide effective lifelines shall be provided.

